June 2010 DRAFT - FOURTH EXPLANATION OF SIGNIFICANT DIFFERENCES FOR USE OF A LOWER HARBOR CAD CELL NEW BEDFORD HARBOR SUPERFUND SITE OPERABLE UNIT #1 NEW BEDFORD, MASSACHUSETTS

I. Introduction

A. Site Name and Location

Site Name: New Bedford Harbor, Upper and Lower Harbor Operable Unit #1 (OU1)
Site Location: Bristol County, Massachusetts

B. Lead and Support Agencies

Lead Agency: United States Environmental Protection Agency (EPA)
Contacts: David Dickerson, Co Remedial Project Manager (617) 918-1329
Elaine Stanley, Co Remedial Project Manager (617) 918-1332

Support Agency: Massachusetts Department of Environmental Protection (MassDEP)
Contact: Joseph Coyne, Project Manager (617) 348-4066

C. Legal Authority for Explanation of Significant Differences

Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and Section 300.435(c)(2)(1) of the National Contingency Plan (NCP) requires that, if any remedial or enforcement action is taken under Section 106 of CERCLA after adoption of a final remedial action plan, and such action differs in any significant respect from the final plan, the EPA shall publish an explanation of the significant differences (ESD) and the reasons such changes were made. While not required by Section 300.435(c), EPA is holding a public comment period on this proposal from June 25 to July 24, 2010 to ensure that all interested parties have an opportunity to provide input to EPA before its final decision on this modification to the remedy.

D. Summary of Proposed ESD

The Record of Decision (ROD or ROD 2) for OU1 was issued on September 25, 1998. The ROD's cleanup plan called for approximately 450,000 cubic yards (cy) of PCB-laden *in situ* sediment to be dredged from the harbor bottom and surrounding wetlands, and to be disposed in perpetuity in four shoreline confined disposal facilities (CDFs). The CDFs were to be located in contaminated areas to avoid the need for dredging an additional approximately 126,000 cy of PCB-contaminated sediment; thus the total volume of sediments above the ROD 2 action levels was estimated in 1996 to be 576,000 cy. See ROD 2, Figure 12 (available at

http://epa.gov/ne/superfund/sites/newbedford/38206.pdf). Since that time EPA has gathered additional site information and refined the cleanup approach for the upper and lower harbor areas. Two prior ESDs, issued in September 2001 and August 2002, refined five elements of the cleanup process and increased the estimated volume of contaminated sediments to approximately 800,000 cy (the 2001 ESD) and eliminated CDF "D" in favor of off-site disposal of the sediments that would have been disposed in it (the 2002 ESD). A third ESD was issued in March 2010 to address temporary storage of dredged material in a lined sediment storage cell at EPA's Sawyer Street facility in New Bedford.

This fourth ESD for ROD 2 modifies the upper and lower harbor remedy to include the construction and use of a confined aquatic disposal (CAD) cell in the lower harbor for disposal of approximately 300,000 cy of mechanically dredged sediments with PCB levels above the ROD 2 action levels.[1] The volume of *in situ* sediments to be placed in this lower harbor CAD cell (LHCC) shall not be greater than the volume of *in situ* sediments slated for CDF D (approximately 725,000 cy) minus the volume of *in situ* sediments disposed or to be disposed offsite pursuant to the 2002 ESD (approximately 150,000 cy as of 6/1/10). See further discussion in Section II.C below. This ESD also notes that, based on an assessment of sediment volume performed in 2003, and including an allowance for over-dredging, the total *in situ* sediment volume above the ROD 2 action levels is currently estimated to be approximately 900,000 cy.

As described in more detail in section III.B below, the time and cost to complete the ROD 2 remedy, as modified by the subsequent ESDs, depends entirely on annual funding rates. See Table 1. Nevertheless, based on current estimates use of the LHCC is expected to significantly decrease both the time and cost to complete the ROD 2 remedy. For example, at a funding rate of $15 million per year the time and cost to complete the remedy pursuant to this fourth ESD is estimated to be 40 years and $1.2 billion, compared to 46 years and $1.7 billion compared to the current remedy as modified by the three previous ESDs. At a funding rate of $80 million per year, the time and cost to complete would be 6 years and $422 million with an LHCC, compared to 7 years ant $464 million without an LHCC.

E. Public Comment Period

A draft of this ESD was issued publicly on June 25, 2010. A formal public comment period regarding the draft ESD will be held from June 25, 2010 to July 24, 2010. EPA is accepting written and e-mailed comments on this ESD which will be included in the administrative record.

EPA is specifically seeking public comment on EPA's finding under the federal Clean Water Act (CWA) that the siting, construction, filling, and long-term operation and maintenance (O&M) of the proposed LHCC represents the least damaging practical alternative to addressing

[1] The mechanically dredged sediments would be placed into the LHCC without going through the hydraulic dredging, desanding and dewatering process described in the 2001 ESD.

potential impacts from PCB-contaminated sediments to wetlands and aquatic habitats within NBH (for further discussion see Section IV below). In addition, EPA requests public comment on EPA's risk-based finding under the Toxic Substances Control Act (TSCA) that the permanent disposal of PCB contaminated sediment into the LHCC will not pose an unreasonable risk of injury to health or the environment. Attachment B contains the draft TSCA finding with further details regarding these issues.

Comments may be submitted by July 24, 2010 as follows:

Mail written comments to:

David Dickerson
USEPA, OSRR07-4
5 Post Office Square - Suite 100
Boston, MA 02109-3912

Send email comments to: NBH_Comments@epamail.epa.gov

F. Public Record

EPA will consider and respond to all formal comments received during the comment period before issuing a final ESD. EPA's response to these comments will be attached as Attachment A. The public comments and EPA's response to them will be part of the public administrative record for the site that is available for public review at the two locations listed below.

EPA New England Records Center
5 Post Office Square
Boston, MA 02109-3912
(617) 918-1440
Monday-Friday: 9:00am - 5:00pm; (closed first Friday of every month and federal holidays)

New Bedford Free Public Library
613 Pleasant Street, 2nd floor Reference Department
New Bedford, MA 02740
(508) 961-3067
Monday-Thursday: 9:00am - 9:00pm
Friday-Saturday: 9:00am - 5:00pm

EPA has supplemented the public administrative record file to reflect the three previous ESDs as well as this fourth ESD.

II. Summary of Site History, Contamination Problems and Selected Remedy

A. Site History and Enforcement Activity

Identification of PCB (polychlorinated biphenyl) contaminated sediments and seafood in and around NBH was first made in the mid-1970s as a result of EPA region-wide sampling programs. The manufacture and sale of PCBs was banned by TSCA in 1978. In 1979, the Massachusetts Department of Public Health promulgated regulations prohibiting fishing, shellfishing and lobstering within the site due to elevated PCB levels in area seafood. Due to these concerns, the site was proposed for the Superfund National Priorities List (the NPL) in 1982, and finalized on the NPL in September 1983. Pursuant to 40 CFR 300.425(c)(2), the Commonwealth of Massachusetts (the Commonwealth) nominated the site as its priority site for listing on the NPL.

EPA's site-specific investigations began in 1983 and 1984. Site investigations continued throughout the rest of the 1980s and early 1990s, including a pilot dredging and disposal study in 1988 and 1989, a baseline public health risk assessment in 1989, and computer modeling of site cleanup options and an updated feasibility study for the site completed in 1990. Thousands of additional environmental samples have been taken since then to support the implementation of the remedy.

Collectively, these investigations identified the former Aerovox manufacturing facility on Belleville Avenue in New Bedford as the primary source of PCBs to the site. PCB wastes were discharged from the facility's operations directly to the upper harbor through drainage trenches and discharge pipes, or indirectly throughout the site via CSOs (combined sewer overflows) and the City's sewage treatment plant outfall. PCBs were also released to the harbor from the Cornell Dubilier Electronics, Inc. (CDE) facility just south of the hurricane barrier in New Bedford.

Based on the results of these investigations, state and federal enforcement actions were initiated against both the Aerovox and CDE facilities as well as the City of New Bedford (though the City is not a Potentially Responsible Party for this site) pursuant to CERCLA, Massachusetts General Law c.21E, and other federal and state environmental statutes. For a summary of these enforcement actions and resulting settlements please see Section II of the 1998 ROD (again, available at www.epa.gov/ne/nbh under technical documents). The site cleanup is being managed by EPA, in partnership with the U.S. Army Corps of Engineers and MassDEP.

In April 1990, EPA issued a ROD for the hot spot operable unit of the site (ROD 1). The hot spot ROD called for dredging and on-site incineration of those sediments above 4,000 ppm (parts per million) PCBs in the vicinity of the Aerovox facility. Dredging and temporary disposal of these sediments - about 14,000 cubic yards (cy) in volume and 5 acres in area - began in April 1994 and was completed in September 1995. Pursuant to an April 1999 amendment to the 1990 Hot Spot ROD, the sediments were dewatered and transported to an offsite landfill for

permanent disposal. This final offsite disposal phase of the hot spot remedy was completed in May 2000.

As summarized above, EPA issued ROD 2 for cleanup of the upper and lower New Bedford Harbor areas in September 1998. Again, ROD 2 originally included four shoreline CDFs but has been been modified with ESDs issued in 2001, 2002 and 2010. Section II.C below describes the ROD 2 remedy in more detail.

B. Contamination Problems

As noted above, the main site concern is the widespread PCB contamination in New Bedford Harbor sediments, especially in the upper harbor. PCB levels in sediment generally decrease in a southerly trend. Because of this sediment contamination, PCBs are also found in elevated levels in the water column and in local seafood. In addition to the PCB contamination, harbor sediments also contain high levels of other contaminants including heavy metals (e.g., cadmium, chromium, copper and lead). High levels of solvents (e.g., trichloroethylene) have also been identified more recently in sediments adjacent to the Aerovox facility. However, because many of these other contaminants are co-located with PCBs, ROD 2 contains action levels only for PCBs.

As described more completely in Sections V and VI of the 1998 ROD, EPA found the PCB contamination to result in unacceptable risks to human health and the environment. The biggest human health risk was found to be from frequent (e.g., weekly) ingestion of local seafood, although unacceptable risks were also found from frequent human contact with PCB-contaminated shoreline sediments or soils. Ecologically, EPA's investigations concluded that the harbor's marine ecosystem is severely damaged from the widespread sediment PCB contamination.

C. Summary of Remedy Originally Selected in the 1998 ROD as Modified by the 2001, 2002 and 2010 ESDs

Due to the sediment PCB contamination and resulting risks to human health and the environment, EPA in the 1998 ROD 2 selected a cleanup remedy for the entire upper and lower harbor areas. The ROD called for the dredging and containment of approximately 450,000 cubic yards (cy) of PCB-contaminated sediment spread over about 170 acres (this original volume estimate has been revised upwards, as described herein). It is important to note that the four original proposed CDFs were sited so as to avoid dredging approximately 126,000 cy of PCB-contaminated sediments within their footprints; thus the volume of *in situ* sediments above the ROD 2 cleanup levels was estimated, in 1996, to be 576,000 cy (450,000 cy plus 126,000 cy). Additionally, the required storage volume of the four CDFs was estimated to be 40% greater than the estimated 450,000 cy needing dredging (i.e., 630,000 cy) to account for the anticipated bulking or expansion of the sediments due to the hydraulic dredging and CDF disposal process.

The ROD 2's cleanup levels are summarized as follows. In the upper harbor north of Coggeshall Street, subtidal and mudflat sediments above 10 parts per million (ppm) PCBs are to

be dredged, while in the lower harbor and in salt marshes, sediments above 50 ppm PCBs are to be dredged. To protect human health against risks due to dermal (i.e., skin) contact with PCBs, intertidal sediments or soils in areas adjacent to residences are to be removed if PCB levels are above 1 ppm, while those adjacent to parks or recreational shoreline areas are to be removed if PCB levels are above 25 ppm.

The ROD also requires that institutional controls, such as the state-sanctioned fish closure areas, be in place until PCB levels in seafood reach acceptable levels for human consumption.

Also, as part of the 1998 ROD 2, Section XI (available at www.epa.gov/ne/nbh) the Commonwealth of Massachusetts petitioned EPA to allow the inclusion of navigational dredging in NBH as an enhancement of the remedy (state enhanced remedy or SER). Such enhancements are envisioned in the implementing regulations of CERCLA at 40 CFR 300.515(f). The enhancement requested by the Commonwealth linked the dredging and disposal of sediments dredged from the harbor's navigational channels (located in the lower and outer harbors) with CERCLA and the Superfund program. Although these navigational sediments primarily fall below the 50 ppm lower harbor cleanup level (and thus do not overlap with sediments slated for remedial dredging) they are nevertheless contaminated with heavy metals and lower levels of PCBs. Under the state enhanced remedy, which is implemented using state and local funding (not Superfund money), CAD cells have been approved and developed for the permanent disposal of dredged navigational sediments within the harbor. The New Bedford Harbor Development Commission (HDC) has, with MassDEP oversight, constructed and filled the navigational CAD cells created through the state enhanced remedy.

The September 2001 ESD set forth five refinements of the remedy that arose as the design phase progressed following the 1998 issuance of ROD 2. These changes included the use of mechanical dewatering for the dredged sediments (to among other things reduce the volume of processed sediments needing disposal), the incorporation of a rail spur and a revised dike design at CDF D, ongoing use of the pilot CDF at EPA's Sawyer Street facility in New Bedford, and identification of additional intertidal cleanup areas near residential land use. The 2001 ESD also noted that the estimate of *in situ* sediments requiring disposal pursuant to ROD 2 could be as high as 800,000 cy.

The August 2002 ESD eliminated CDF D in favor of off-site disposal for those sediments that otherwise would have been disposed in it. CDF D had a planned disposal volume or "air space" of approximately 435,000 cy (Foster Wheeler, 1996). Since the hydraulic dredging, desanding and dewatering process results in a significant decrease in the volume of processed sediment (Jacobs, 2008) this 435,000 cy of air space is estimated to translate to approximately 725,000 cy of *in situ* sediments that could have been disposed in CDF D (using a ratio of 0.6 cy of processed sediment or filter cake per 1 cy of *in situ* sediment).

The March 2010 ESD allowed for the temporary storage of PCB- and VOC-contaminated sediments in a lined and covered storage cell ("Cell #1") at EPA's facility at the foot of Sawyer Street in New Bedford.

III. Description of Significant Differences and the Basis for These Differences

As summarized in Section I, EPA has evaluated the benefits of using an LHCC for disposal of a portion of the sediments that, pursuant to ROD 2, would have been disposed in CDF D, but as modified in the 2002 ESD, would have been disposed off site. Based on the evaluation described below, EPA believes that use of an LHCC is a protective and cost-effective approach compared to offsite disposal for these sediments.

A. Siting, construction and long-term O&M of the LHCC can be performed protectively.

CAD cell technology is a recognized, protective contaminated sediment disposal approach that is being used more and more frequently, especially for navigational dredged material that is unsuitable for open water disposal. CAD cells have been used in recent years for navigational dredging in major New England ports such as Boston, New Bedford and Providence, and have also been used (or selected for use) at contaminated sediment Superfund sites in Washington, Minnesota and Maine (EPA, 2010).

The preferred location for navigational CAD cells in New Bedford (between the Route 195 and Route 6 bridges) was determined in the October 2003 final Environmental Impact Report (FEIR) for the New Bedford/Fairhaven Harbor Dredge Material Management Plan (DMMP) prepared by the Massachusetts Office of Coastal Zone Management (MassCZM, 2003). The FEIR, prepared to comply with the Massachusetts Environmental Protection Act and its implementing regulations (G. L. c. 30, ss. 61-62H; 301 CMR 11.00) concluded that this area, referred to as "Popes Island North" was the preferred location for CAD cells due to, among other factors, its greater depth to bedrock and thus higher disposal capacity, its location outside of main navigational channels, its lower potential for cap disruption, and its higher potential for benthic recolonization (FEIR, pp. 4-15 – 4-17). Subsequent to the FEIR, the exact boundary of the DMMP CAD cell area has been modified twice, in January 2005 and April 2008, but remains bounded by the Route 195 bridge to the north and the Route 6 bridge to the south (Figure 1). EPA, after reviewing the FEIR and additional site information, proposes to locate the Superfund LHCC within this state-approved DMMP area.

For the state enhanced remedy CAD cells in NBH and as is typical for CAD cells in general, the CAD cells were constructed by first removing the top few feet of contaminated organic silts since this material is unsuitable for open water disposal (i.e., contamination levels are too high for open water disposal). This unsuitable material has been disposed of within the navigational CAD cells.[2] For the proposed Superfund LHCC, disposal of the unsuitable top-of-CAD material may be in an existing navigational CAD cell, if available; other disposal options such as appropriate shoreline CDFs or licensed landfills will be considered and the most cost-

[2] The unsuitable contaminated sediment from the top of the first navigational CAD cell was disposed in an existing depression (a "borrow pit" which had been created decades previously from the process of mining underwater sand). The unsuitable top-of-CAD material from CAD cell #2 was disposed in CAD cell #1.

effective and protective option will be used. Once the unsuitable material is removed, the underlying clean glacial sandier material is then excavated and either disposed at permitted open water disposal sites or routed for beneficial reuse.

Excavation of the CAD cell will be conducted using best management practices that will minimize environmental impacts, including maintaining water quality performance standards. Benthic marine habitat removed during CAD construction will be restored in place once the CAD cell is filled and capped with clean material. The cap, consisting of 3 feet of clean sandy material will prevent contact with, and the release of, contaminants from the underlying deposited Superfund sediments, EPA will also investigate whether adding activated carbon or other supplements to the CAD cell would further limit the mobility of the contaminants within it.

Sediments that would be placed into the proposed Superfund LHCC would be dredged using mechanical dredging equipment similar to that used for the navigational dredging to date. The dredged sediments would be placed into a scow for transport to the proposed LHCC. The dredged sediment would not be mechanically dewatered prior to placement, although some passive dewatering would occur during material handling and transport. Depending on the type of equipment used, the dredged sediments would be placed into the LHCC by either opening the bottom of the scow (if a "split-hull scow is used) or by using an excavator bucket to remove the sediments from the scow and to place them into the LHCC. A silt curtain and oil boom would be placed around the perimeter of the LHCC. Best management practices, including water and air quality monitoring, will occur during the mechanical dredging, transportation and placement processes to ensure that no exceedances of project performance standards occur and that the placed sediments stay within the LHCC.

EPA proposes to enter into a cooperative agreement, pursuant to 40 CFR Part 35, Subpart O, with the HDC to have the HDC, utilizing its experience with creating navigational CAD cells within the harbor, construct the Superfund CAD cell. Depending on the timing of both the Superfund and state enhanced remedy dredging, the CAD cell may be excavated so that it is large enough to accept both Superfund and navigational dredged sediments. Whether the CAD cell contains just Superfund sediment or if it also includes navigational dredge material, long-term O&M of the entire CAD cell will be a component of the Superfund remedy, conducted by MassDEP. This O&M will include bathymetric surveys to determine elevation changes in the harbor bottom, sediment chemistry to evaluate whether contamination is remaining in place and not posing any site risks, and biological monitoring to track the benthic recolonization of the CAD cell cap.

As of June 2010, two CAD cells for navigational dredged material disposal have been successfully constructed and filled in NBH (CAD cells #1 and #2) as part of the state enhanced remedy, and are functioning effectively to contain approximately 200,000 cy of dredged sediments. Section III.B.1 below describes the plume tracking, toxicity testing and water quality monitoring that was performed in 2009 during placement operations at navigational CAD cell #2. EPA has reviewed this information as part of its evaluation of whether the placement of contaminated sediments above ROD 2 action levels within a CAD cell could be conducted in a

manner that is protective of human health and the environment.

B. Evaluation of short and long term impacts from an LHCC

The following information was evaluated to determine the protectiveness of the proposed change to the remedy:

1. 2009 plume tracking and toxicity testing during placement operations at navigational CAD cell #2

The most recent phase of navigational dredging in 2009 included CAD cell disposal of sediments dredged from areas in close proximity and with physical characteristics similar to areas slated for Superfund dredging. EPA therefore commissioned extensive water quality monitoring of the navigational CAD cell disposal process to document the efficacy of the operation (Battelle, 2009). In summary, this monitoring did not detect any acute or sub-lethal aquatic toxicity inside or outside of the CAD cell (CAD cell #2) during placement and found that the silt curtain around the CAD cell was successful in containing plumes of turbidity from the placement activities. Only small filaments of turbidity in close proximity to the silt curtain were detected, likely escaping from a seam in the silt curtain. Plumes inside the CAD cell were found to dissipate to near background levels within 1 to 1-1/2 hours. The reader is encouraged to review the report, available at http://epa.gov/ne/nbh/pdfs/299744.pdf, since many color-coded "snapshots" over time of these turbidity plumes are included. One of these snap-shots is included herein as Figure 2.

2. Computer modeling of short and long term water quality impacts

In order to estimate the short and long term water quality impacts of using an LHCC, EPA commissioned the U.S. Army Corps of Engineers' Engineer Research and Development Center (ERDC) in Vicksburg, Mississippi to perform state-of-the-science computer modeling (ERDC, 2010). Sediment and water column samples were collected from appropriate geographic areas of NBH to ensure the accuracy of the modeling effort. The model's conclusions are as follows:

a. A 650-foot square CAD cell excavated 47 ft below the existing sediment surface is sufficient in size to hold and cap the sediments proposed for a lower harbor CAD cell and to contain the lateral spread and collapse of the dredged material discharge during placement.

b. About ten feet of water will be entrained in the dredged material during placement, but all of this water is predicted to be expelled from the consolidating dredged material during the three years of placement assumed by the model.

c. An additional eleven feet of settlement and pore water expulsion is predicted to occur in the first 40 years after cap placement.

d. Dredged material resuspension will occur during placement, resulting in predicted total suspended solids (TSS) concentrations ranging from 20 to 150 mg/L and both dissolved and

particulate-associated contaminant release to the water column overlying the CAD cell.

e. The resuspension predictions appear to be a reasonable and conservative representation of the behavior of actual plumes observed during similar dredged material placement into navigational CAD cell #2 in 2009.

f. Dissolved contaminant concentrations in the CAD cell water (but not the overlying water) during filling will become approximately equal to the sediment pore water being placed in the CAD cell.

g. About 2.4 kg of PCB are predicted to be lost during dredged material placement in the lower harbor CAD cell, 85% of which would be dissolved. About 44 kg of copper are predicted to be lost during dredged material placement, 50% of which would be dissolved. These losses represent about 0.038% of the total PCB mass and 0.020% of the total copper mass being placed into the CAD cell.

h. Hydrodynamics modeling yielded only low velocities in the water column above the CAD cell, typically less than 0.3 feet per second (fps). The velocity is sufficiently great to rapidly exchange the water above the CAD cell, typically in one to three hours. The velocity is sufficiently low to limit any mixing in the CAD cell water, mostly in the top few feet. However, higher resolution hydrodynamic modeling of the CAD cell environ performed using the 3-D EFDC (Environmental Fluid Dynamic Code) model set up for sediment transport modeling showed the potential to set up a slow vertical eddy in the CAD cell. The eddy could provide slow mixing to a depth of ten feet below the lip of the CAD cell. Therefore, contaminants in the top ten feet of the CAD cell are assumed to undergo turbulent diffusion and exchange with the water column above the lip of the CAD cell.

i. Additional losses due to potential turbulent diffusion and thermally induced displacement over the winter between dredging seasons could result in about 2.7 kg of additional PCB being lost from the CAD cell water prior to capping, resulting in a total loss from placement operations of 0.08% (5.2 kg) of the total PCB mass (approximately 6,500 kg) disposed in the cell. Similarly, an additional loss of about 18 kg copper could be lost by these mechanisms, resulting in a total placement loss of about 0.03% (63 kg) of the total copper mass (approximately 225,000 kg) disposed in the cell.

j. Placement losses are predicted to be one to two orders of magnitude less than typical losses from mechanical dredging operations.

k. After capping, the contaminants expelled from the dredged material by consolidation would be contained in the lower foot of the cap.

l. Without consideration of burial (i.e., the additional sediment deposition that will take place over time into the bowl-shaped CAD cell depression formed by consolidation after the cap is placed) contaminant breakthrough will take more than 1800 years. Breakthrough, as used in this

modeling, is defined as the condition when the contaminant flux or surficial pore water concentration increases to levels of 0.01% of the original flux or sediment bed concentration before dredging and disposal. With burial promoted by the estimated eleven feet of post-cap dredged material settlement, the transport of contaminants through the cap and burial material will take tens of thousands of years to achieve the breakthrough. Without considering burial, the model predicted that 50 years after being capped, the cap would contain 7 ng/kg (parts per trillion) PCB and 100 ng/l copper - levels that are well below levels of concern.

m. A stable 3-ft cap would be highly effective in isolating the contaminated dredged material.

n. Reducing the placement schedule from three years to one or two years would increase the size of the CAD cell needed to contain the approximately 300,000 cubic yards of sediment proposed for placement in the lower harbor CAD cell while maintaining conditions to promote settling and stability. The increase in storage requirements is due to shortening the time available for consolidation. Schedule acceleration is also predicted to decrease the contaminant losses due to the reduction in the exposure of contaminated CAD cell water for losses to occur.

It should also be noted that the Superfund sediments slated for the proposed LHCC would be the less contaminated remaining Superfund sediments (average PCB levels of dredge areas generally less than 100 ppm) from approximately the Sawyer Street area south. It is these sediments that the ERDC modeling is based upon.

In addition, EPA and ERDC will be performing large-scale laboratory studies to evaluate the ability of activated carbon to "strip" PCBs in the water column within a CAD cell, thereby minimizing PCBs that might otherwise be released to the surrounding environment. If this evaluation proves successful, placement of activated carbon into the water column within the proposed LHCC's silt curtain would be incorporated into the remedy.

3. Computer modeling of air quality impacts

Since the proposed mechanical dredging and LHCC disposal process uses different dredging and disposal methods than currently employed by the Superfund cleanup, EPA commissioned an air modeling effort to evaluate potential air quality impacts from it (Jacobs, 2010a). Results of this modeling indicate that the predicted maximum annual impacts from the proposed mechanical dredging and LHCC disposal, even with background sources included, would remain far below the risk-based ambient air concentrations established for nearby children, residences or commercial workers.

4. Performance standards and engineering controls will be used to ensure protectiveness

Section IV below discusses the various performance standards and engineering controls that will be used to ensure that use of an LHCC for disposal of Superfund sediments is performed in a manner that is protective of human health and the environment.

C. Disposal into an LHCC is estimated to significantly reduce the time and cost to complete the harbor cleanup

Because of the large scope and magnitude of the ROD 2 remedy, both the time and total cost to complete the remedy is dependent on the level of annual funding. Nevertheless, as summarized in Table 1 below, EPA's updated evaluation (Jacobs, 2010b) concludes that use of an LHCC would take significantly less time and money to complete the harbor cleanup compared to the existing ROD 2 remedy as modified by the three previous ESDs. This is due to the fact that the sediments going to the LHCC would be mechanically dredged and placed into it, thereby avoiding the desanding, dewatering and offsite transportation and disposal costs that would otherwise be associated with the hydraulic dredging of these sediments. Note that O&M costs are not included in Table 1, but are included in Jacobs, 2010b, part of the administrative record file.

To facilitate the cost comparison of the two cleanup approaches and the three annual funding levels evaluated ($15, $30 and $80 million per year) the estimated costs in Table 1 include both the Net Present Value (NPV) cost and the "actual" cost. The NPV cost represents the sum of money that, if invested at the start of a project, could fund the project - taking into consideration both the annual funding outlays and interest earned on the unused balance. The NPV cost was calculated by having all forecasts of future costs made in 2010 dollars, and then discounting by the appropriate discount rate to reflect the year of implementation of each cost. These NPV values do not account for inflation. The "actual" cost is the sum of all annual costs, assuming 3.5% inflation per year. Also note that the time and cost to complete estimates in Table 1 are for 2010 forward.

	Current Remedy (3 CDFs and Offsite T&D)			**Proposed Remedy (3 CDFs, interim T&D, LHCC)**		
Funding level	**Time to complete**	**Cost to complete (NPV)**	**Cost to complete (actual)**	**Time to complete**	**Cost to complete (NPV)**	**Cost to complete (actual)**
$15m/year	46	$413m	$1.7B	40	$362m	$1.2B
$30m/year	40	$477m	$1.2B	26	$401m	$767m
$80m/year	7	$464m	$536m	6	$393m	$422m

Table 1 - Comparison of the Current ROD 2 Remedy to the Proposed Remedy

D. Collaboration with navigational dredging may reduce environmental impacts and increase cost-effectiveness

Since additional navigational dredging is anticipated for NBH, EPA will continue to coordinate with the relevant local, state and federal navigational dredging stakeholders to determine if economies of scale and reduced environmental impacts can be achieved by combining the Superfund LHCC proposed herein with other navigational dredging and disposal activities. As also discussed in Section III.A above, if funding is available in a timely fashion for additional navigational dredging, a large combined Superfund/navigational dredging CAD cell rather than a series of smaller CAD cells would likely be less expensive, have a smaller benthic footprint and cause less environmental impacts. EPA would not allow implementation of the Superfund LHCC proposed herein to be significantly delayed, however, due to a lack of timely navigational dredging funding for adding to the size of the LHCC to hold navigational dredge material.

E. Potential for beneficial use of clean CAD cell sand

Including an LHCC into the Superfund remedy would provide the opportunity to make use of the clean sandy material excavated from the "bottom-of-CAD" to improve the protectiveness of the harbor cleanup. Potential beneficial uses of this material include, but are not limited to:

- use as a clean cap material to complete the pilot underwater cap south of the hurricane barrier near the Cornell-Dubilier facility;

- use as clean cap material for the existing navigational dredging CAD cells in the lower harbor (located between the Route 6 and Route 195 bridges).

- use as clean "backfill" in areas dredged to date north of Coggeshall Street (i.e., mudflat restoration)

These conceptual uses will be evaluated during project implementation to determine the efficacy and cost-effectiveness of the various disposal and reuse options.

IV. Applicable or Relevant and Appropriate Requirements (ARARs) for CAD Cell Siting and Construction, Mechanical Dredging and Sediment Disposal in a CAD Cell

The proposed modification of the remedy to replace off-site disposal of a certain volume of contaminated sediments with mechanical dredging and onsite disposal in an LHCC require the addition and/or modification of a number of ARARs that have been identified in ROD 2 and the subsequent three ESDs that have modified it.

The selected remedy will comply with all federal and any more stringent state ARARs that pertain to the remedial action (see Table 2). In making this determination, EPA has made the following specific findings:

- Pursuant to regulations under the federal Clean Water Act, 40 CFR Part 230, Subpart B, EPA has made a draft determination that the remedy is the least damaging practicable alternative with respect to potential impacts to federal jurisdictional wetlands and aquatic habitats and is soliciting public comment concerning the draft determination. The determination is based on the following findings;

    1. The use of CAD cells in the harbor will permit the remedy to sequester PCB-contaminated sediment, currently posing a risk to federal jurisdictional wetlands/aquatic habitats, significantly faster than either the original ROD 2 remedy of on-site disposal in CDFs or the ESD-modified remedy of dewatering and off-site disposal.

    2. CAD cells are a proven technology for sequestering contaminated sediments, although the levels of PCBs within the Superfund sediments to be disposed of are higher than other sites where CAD cells have been used.

    3. Siting of the proposed Superfund CAD cell north of Pope's Island is based on an extensive review by the State of potential CAD sites in NBH, which included public involvement.

    4. The proposed CAD Site was determined to be the preferred location for siting CAD cells in NBH due to, among other factors, its greater depth to bedrock and thus higher disposal capacity, its location outside of main navigational channels, its lower potential for cap disruption, and its higher potential for benthic recolonization.

    5. Short-term impacts from the construction of the proposed CAD cell can be addressed by best management practices during excavation operations to address water quality issues, proper handling and disposal of excavated material, and proper closure of the cell.

    6. Mechanical dredging and placement of contaminated sediment within the CAD cell will be conducted using best management practices and monitoring to prevent/limit releases during the mechanical dredging, transportation and placement that would impair wetland/aquatic resources. EPA has already worked with the HDC during their filling of the navigational CAD cells in NBH to optimize placement and monitoring techniques.

    7. CAD cell closure includes capping with clean material (which replaces the contaminated sediment formerly in the area) which will allow the benthic environment to become reestablished; and long-term O&M and monitoring to ensure that contaminated sediment within the CAD cell remains sequestered.

8. Activated carbon or other supplements placed within the CAD cell may be used to further demobilize contamination within it.

- EPA has made a draft finding pursuant to TSCA PCB Regulations at 40 CFR Part 761, that the disposal of PCB-contaminated sediment from the "top-of-CAD" during CAD cell construction and the disposal of PCB-contaminated sediment from the Superfund remedy into the CAD cell will not pose an unreasonable risk of injury to health or the environment as long as certain conditions are met concerning disposal practices, O&M including long-term monitoring, and use restrictions. These conditions are listed in a draft TSCA finding attached to this proposed ESD (Attachment B). A final determination will be made after considering all public comments received by the Agency during the public comment period.

Ambient air monitoring will also be performed to ensure that nearby workers and residents are not adversely impacted by the mechanical dredging, barge-transport or cell disposal operations. In addition to the current set of ambient air monitoring locations for the harbor cleanup, additional monitoring location(s) will be established specifically to evaluate potential emissions from the proposed LHCC. The harbor cleanup's Public Exposure Tracking System (PETS) will be used to evaluate the air monitoring results and ensure that use of an LHCC does not endanger human health.

V. Supporting Agency Comments

The MassDEP has reviewed the draft ESD and supports the currently proposed changes to the 1998 ROD. The MassDEP will evaluate public comments on the draft ESD before making a final decision on concurrence with the ESD.

VI. Statutory Determinations

As discussed above in Section IV, this ESD includes a draft determination under TSCA 40 CFR Sec. 761.61(c) that creation and use of the lower harbor CAD cell does not pose an unreasonable risk of injury to health or the environment. This determination is attached as Attachment B.

EPA has also determined, in compliance with Section 404 of the Clean Water Act and Executive Order 11990 (Protection of Wetlands) that the proposed modification of the ROD 2 remedy to change, for a certain amount of sediments as discussed herein, mechanical dewatering and off-site disposal of contaminated sediment to mechanical dredging, passive dewatering and onsite disposal in the proposed LHCC is the least damaging practicable alternative to preventing contaminated sediments in the harbor from impairing federal jurisdictional wetlands/aquatic habitats. The determination takes into account the remedy's ability to mitigate short-term impacts to aquatic resources from the construction of the LHCC and the mechanical dredging, barge-transport and disposal of contaminated sediments into the cell. The determination is also based on the long-term benefits from being able to expedite sequestration of contaminated sediments in the

proposed LHCC that are currently posing a risk to wetland and aquatic resources in the harbor. In comparison, off-site disposal of these sediments will take significantly longer and will cost significantly more to address site risks. The higher costs effect how quickly the harbor remedy will be able to achieve sediment cleanup standards and the protection of wetland/aquatic resources within NBH.

EPA believes that the remedy as modified herein remains protective of human health and the environment, complies with all Federal and State requirements that are applicable or relevant and appropriate to the remedy as modified herein (and which were not waived in the 1998 ROD), and is cost-effective. In addition, the revised remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site.

VII. Public Participation

EPA, the Army Corps of Engineers and MassDEP meet regularly with site stakeholders to keep them up to date with the site's cleanup status, including the issues described herein. For example, monthly update meetings open to all interested parties are held (typically the last Thursday of the month at 7pm at the main branch of the New Bedford Public Library) as well as other periodic meetings with abutting neighborhood groups. Additional meetings and outreach efforts with other groups occur as necessary to successfully implement the cleanup program.

As explained above in Section I.E, EPA held an informational public meeting on June 24, 2010 specifically to discuss the draft ESD's proposed modifications to the remedy, and to answer questions about it. In addition, EPA held an informational public meeting on January 28, 2010 which focused on the proposed use of an LHCC for Superfund sediments and EPA's on-going evaluation of it. Discussion of the LHCC concept has also occurred as part of the monthly update meetings discussed above, and the field monitoring and computer modeling reports that evaluated the LHCC have been posted on the harbor cleanup's website (www.epa.gov/ne/nbh) well in advance of the start of the comment period. Public comments received will be addressed in a Responsiveness Summary that will be attached to the final ESD.

VIII. Declaration

For the foregoing reasons, by my signature below, I approve the issuance of an Explanation of Significant Differences for the New Bedford Harbor Superfund Site located in New Bedford, Acushnet, Fairhaven and Dartmouth, Massachusetts and the changes and conclusions stated therein.

_____ _____

James T. Owens, III, Date
Director, Office of Site Remediation and Restoration
USEPA – Region 1 New England

References Cited

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3. Foster Wheeler, 1996. Draft Phase 2 Cost Estimates. June 1996. Available in the Administrative Record for the 1998 ROD, document number 4.4.4, p.89.

4. Jacobs, 2008. Email from Anita Rigassio-Smith (Jacobs Engineering) to Dave Dickerson (USEPA Region 1) dated 4/18/08. Available in the draft Administrative Record for the June 2010 CAD Cell ESD.

5. Jacobs, 2010a. Final Evaluation of the Impact of Dredging and CAD Cell Disposal on Air Quality, New Bedford Harbor Superfund Site. June 2010. Available at http://epa.gov/ne/nbh/pdfs/466822.pdf as well as in the draft Administrative Record for the June 2010 CAD Cell ESD.

6. Jacobs, 2010b. ESD Cost Estimates, Jacobs Engineering. June 2010. Available in the draft Administrative Record for the June 2010 CAD Cell ESD.

7. MassCZM. 2003. Final Environmental Impact Report for New Bedford and Fairhaven's Dredge Material Management Plan. Massachusetts Office of Coastal Zone Management. October 2003. Available at http://www.mass.gov/czm//dredgereports/2003/feirnb-f.htm as well as in the draft Administrative Record for the June 2010 CAD Cell ESD.

8. EPA, 2010. Presentation Given at the January 2010 Public Meeting, New Bedford Harbor Superfund Site. Available at http://epa.gov/ne/nbh/pdfs/presentations/299745.pdf as well as in the draft Administrative Record for the June 2010 CAD Cell ESD.

Figures

Insert Table 2

Attachment A - Response to Comments

Attachment B – TSCA 40 CFR Section 761.61(c) Determination

Based on prior manufacturing operations in New Bedford, PCB-contaminated sediments in New Bedford Harbor likely meet the definition of a *PCB remediation waste* as defined under 40 CFR Section 761.3 and thus are regulated for cleanup and disposal under 40 CFR Part 761.

In accordance with the requirements under the Toxic Substances Control Act (TSCA) and 40 CFR Section 761.61(c), I have reviewed the Administrative Record for the site and considered the CAD cell disposal of PCB-contaminated sediment set out in the [September] 2010 Explanation of Significant Differences (ESD) for the first operable unit of the New Bedford Harbor Superfund Site. Under this Section, *PCB remediation waste* may be disposed of in a manner other than prescribed under Section 761.61(b) provided EPA determines that this alternative disposal does not result in an unreasonable risk of injury to health or the environment. The ESD's plan includes removal and disposal of dredged PCB-contaminated sediment in a lower harbor CAD cell (LHCC). Based on the information provided, the ESD's proposed plan is believed to not pose an unreasonable risk of injury to health or the environment as long as the following conditions are met:

1. Water quality monitoring shall be performed during mechanical dredging and barge-transport as well as during all phases of the LHCC (i.e., construction, filling and capping) to ensure that turbidity and toxicity levels comply with the Superfund harbor cleanup performance criteria (see www.epa.gov/ne/nbh under Technical Documents).

2. If surface sediments removed from the footprint of the Superfund CAD cell contain PCB levels greater than1 ppm they shall be disposed of in a navigational CAD cell or other navigational disposal site in the harbor that is compliant with Section 761.61(c) of TSCA or disposed of off-site in a suitable licensed disposal facility.

3. Air monitoring and, if appropriate, dust suppression measures shall be implemented to ensure that airborne PCB levels from the mechanical dredging, barge-transport and CAD cell operations are below levels of concern, as established in the Superfund harbor cleanup Public Exposure Tracking System (see www.epa.gov/ne/nbh under Technical Documents).

4. Should laboratory-scale studies demonstrate that placement of activated carbon into the LHCC during or between placement events can reduce and/or minimize PCB levels in the water column within and above the CAD cell, then activated carbon shall be so used in accordance with the results of the laboratory-scale study(ies).

5. The LHCC shall be capped with a minimum of three feet of clean material, after waiting a minimum of six months after placement of all contaminated dredged material into the LHCC to allow for consolidation and compaction.

6. Once capping is complete, the LHCC and cap shall be monitored to ensure that the LHCC and cap are functioning as predicted and that the integrity of the cap is maintained.

Monitoring shall include, at a minimum, bathymetric surveys, sediment chemistry, water quality monitoring, and evaluation of biological recolonization.

For the first two years after capping, this monitoring shall be performed semi-annually (except that the biological evaluation shall only be performed annually). For the third, fourth and fifth year after capping, this monitoring shall be performed annually. The fifth year's monitoring report shall include a recommended frequency for future monitoring, but in no event shall this future monitoring frequency be less than once every five years.

Monitoring reports for each monitoring event shall be submitted to EPA no later than one year after all monitoring data has been received for a given monitoring event.

7. Institutional controls shall be implemented to ensure the long term integrity of the LHCC cap. These shall include, but not be limited to, placement of the LHCC on the National Oceanic and Atmospheric Administration's (NOAA's) navigational charts, incorporation of the LHCC into the New Bedford Harbor Master Plan, and development of mooring and anchoring regulations specifically for the LHCC. These regulations shall specify the type(s) of moorings and anchors that will be allowed in the LHCC; these moorings and anchors shall not be allowed to penetrate into or below the bottom foot of the cap.

_____ _____

James T. Owens, III Date
Director, Office of Site Remediation and Restoration